UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,041	02/13/2004	Maryellen L. Giger	248939US20	3848

22850 7590 12/19/2008

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
WOLDEMARIAM, AKILILU K	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
12/19/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/777,041	GIGER ET AL.	
	Examiner	Art Unit	
	AKLILU k. WOLDEMARIAM	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-7,10,11,13-17,20,21,23-27 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-7,13-17,20,21,23-27 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/14/2008, 05/10/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. *Applicant's amendment field on 09/12/2008 has been entered. Claims 1, 3-5, 11, 13-15, 21, 23-25 have been amended. Claims 2, 8-9, 12, 18-19, 22 and 28-29 have been cancelled. Claims 1, 2-7, 10-11, 13-17, 20-21, 23-27 and 30 are still pending, with claims 1, 11 and 21 being an independent.*

Response to Arguments

2. Applicant's arguments field on 09/12/2008 have been respectfully considered, however, examiner rejected claim inventions under new ground of rejections. Therefore, the arguments are moot.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. *Claims 1, 3-7, 10-11, 13-17, 20-21 and 23- 27 and 30* are rejected under 35 *U.S.C. 103(a) as being unpatentable over Huo et al., "Huo" (U.S. Patent number 6, 282,305 B1) in view of Rogers et al., "Rogers" (U.S. Patent number 5, 671, 294).*

Regarding claim 1, *Huo discloses* a method for a computerized analysis of a mammogram in digital form of a breast of a patient *(see column 9, line 6-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns*

and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk), comprising:

extracting from the mammogram plural fractal-based features *(see column 9, line 60-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk);*

applying said plural fractal-based feature features to at least one of a linear discriminant classifier and an artificial neural network classifier *(see column 9, lines 48-59, In performing the comparison of extracted features with the model, at least one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted features) and an artificial neural network classifier (see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer);* and

generating a risk marker indicative of a breast disease risk for said patient based on an output of at least one of a linear discriminant classifier and an artificial neural network classifier *(see column 9, lines 30-59, the extracted features are compared with a predetermined model based on gene carrier information and clinical information, and a risk classification index is output as a result of the comparison) and an artificial neural network classifier (see column 9, lines 48-59, extracted features are merged into a*

measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).

Hugo does not disclose at multiple scales associated with a texture of a parenchyma of the breast.

However, Rogers discloses at multiple scales associated with a texture of a parenchyma of the breast *(see column 5, line 59-column 6, line 25, this results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).*

It would have been obvious to ordinary skill in the art at the time when the invention was made to use Rogers's extracting from the mammogram plural fractal-based features at multiple scales associated with a texture of a parenchyma of the breast in Huo's a method for a computerized analysis of a mammogram in digital form of a breast of a patient because it will allow to provide an image analysis system that will provide a cost efficient means for providing mammographic screening programs to large segments of the pollution, *[Rogers, column 3, lines 3-6].*

Huo discloses extracting plural fractal based features.

Huo does not disclose multiple scales surface areas or volumes at multiple pixel sizes as the plural fractal-based features.

However, Rogers discloses regarding claim 3, the method according to Claim 1, wherein the extracting step comprises:

extracting plural fractal based features at multiple scales surface areas or volumes at multiple pixel sizes as the plural fractal-based features *(see column 5, line 59-column 6, line 25, this results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).*

Regarding claim 4, Hugo discloses the method according to Claim 1, wherein the extracting step comprises:

extracting plural fractal-based features from an area of a region of interest of the mammogram based on a box-counting method *(see column 11, lines 3-16, the computerized method for the assessment of breast cancer risk based on the analysis of mammography parenchymal patterns and box-counting method is well known in an ordinary skill in the art).*

Regarding claim 6, *Huo discloses* the method according to Claim 1, wherein the applying step comprises:

applying the features to a linear discriminant analysis classifier *(see column 9, lines 48-59, in performing the comparison of extracted features with the model, at one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted features).*

Regarding Claim 7, *Huo discloses* the method according to Claim 1, wherein the applying step comprises:

applying the features to an artificial neural network classifier *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of*

acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).

Regarding Claim 10, *Huo discloses* the method according to Claim 1, wherein the extracting step comprises:

extracting from the mammogram determining a multi-fractal characteristic associated with the texture of the parenchyma of the breast *(see column 9, line 60-column 10, line 8, extract features that characterize mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk).*

Regarding claim 11, *Huo discloses* a system for computerized analysis of a mammogram in digital form of a breast of a patient (*see column 9, line 60-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk)*, comprising:

a feature extraction mechanism that extracts from the mammogram at least one plural fractal-based features *(see column 9, line 60-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk);*

a classifier mechanism including at least one of a linear discriminant classifier *(see column 9, lines 48-59, in performing the comparison of extracted features with the model at least one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted features)* and

an artificial neural network to which the plural fractal-based features are applied *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer)*; and

a risk marker generator that generates a risk marker indicative of a breast disease risk for said patient based on an output of the classifier mechanism *(see column 9, lines 30-59, the extracted features are compared with a predetermined model based on gene carrier information and clinical information, and a risk classification index is output as a result of the comparison) and an artificial neural network classifier (see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).*

Huo does not disclose at multiple scales associated with a texture of a parenchyma of the breast.

However, Rogers discloses at multiple scales associated with a texture of a parenchyma of the breast *(see column 5, line 59-column 6, line 25, this results in a set*

of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).

It would have been obvious to ordinary skill in the art at the time when the invention was made to use Rogers's at multiple scales associated with a texture of a parenchyma of the breast in Huo's a method for a computerized analysis of a mammogram in digital form of a breast of a patient because it will allow to provide an image analysis system that will provide a cost efficient means for providing mammographic screening programs to large segments of the pollution, *[Rogers, column 3, lines 3-6].*

Huo discloses the feature extraction mechanism extracts plural fractal based features.

Huo does not disclose at multiple scales surface areas or volumes at multiple pixel sizes as the plural fractal-based features.

However, Rogers discloses regarding claim 13, the system according to Claim 11, wherein the feature extraction mechanism extracts plural fractal based features at multiple scales surface areas or volumes at multiple pixel sizes as the plural fractal-based features *(see column 5, line 59-column 6, line 25, this results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).*

Regarding claim 14, *Huo discloses* the system according to Claim 11, wherein the feature extraction mechanism extracts plural fractal-based features from an area of a region of interest of the mammogram based on a box-counting method *(see column*

11, lines 3-16, the computerized method for the assessment of breast cancer risk based on the analysis of mammographic parenchymal patterns and box-counting method is well known).

Regarding Claim 16, *Huo discloses* the system according to Claim 11, wherein the classifier mechanism comprises a linear discriminant analysis classifier *(see column 9, lines 48-59, in performing the comparison of extracted features with the model at least one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted features).*

Regarding claim 15, *Rogers discloses* the system according to Claim 11, wherein the feature extraction mechanism extracts the plural fractal-based features from a volume of a region of interest of the mammogram based on a general Minkowski model *(see column 5, line 59-column 6, line 25, this results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale and what is a general Minkowski modes please clarify it).*

Regarding Claim 17, *Huo discloses* the system according to Claim 11, wherein the classifier mechanism comprises an artificial neural network classifier *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).*

Regarding Claim 20, *Huo discloses* the system according to Claim 11, wherein the feature extraction mechanism extracts from the mammogram a multi-fractal characteristic associated with the texture of the parenchyrna of the breast *(see column*

9, line 60-column 10, line 8, extract features that characterize mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk).

Regarding claim 21, *Huo discloses* a computer readable medium storing instructions for execution on a computer system, which when executed by the computer system, causes the computer system to perform a method for a computerized analysis of a mammogram in digital form of a breast of a patient (*see column 9, line 60-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk)*, comprising the steps of:

extracting from the mammogram plural fractal-based features *(see column 9, line 60-column 10, line 8, the present invention thus involves the development of a computerized method to automatically extract features that characterized mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk),*

applying said plural fractal-based features to at least one of a linear discriminant classifier *(see column 9, lines 48-59, In performing the comparison of extracted features with the model at least one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted features)* and an artificial neural network classifier *(see column 9, lines 48-59, extracted features are*

merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer); and

generating a risk marker indicative of a breast disease risk for said patient based on an output of the at least one of a linear discriminant classifier *(see column 9, lines 30-59, the extracted features are compared with a predetermined model based on gene carrier information and clinical information, and a risk classification index is output as a result of the comparison) and an artificial neural network classifier (see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer)* and

an artificial neural network classifier *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).*

Huo does not disclose at multiple scales associated with a texture of a parenchyma of the breast.

However Rogers discloses at multiple scales associated with a texture of a parenchyma of the breast *(see column 5, line 59-column 6, line 25, this results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).*

It would have been obvious to ordinary skill in the art at the time when the invention was made to use Rogers's at multiple scales associated with a texture of a parenchyma of the breast in Huo's a method for a computerized analysis of a mammogram in digital form of a breast of a patient because it will allow to provide an image analysis system that will provide a cost efficient means for providing mammographic screening programs to large segments of the pollution, *[Rogers, column 3, lines 3-6].*

Regarding claim 23, *Rogers discloses* the computer readable medium according to Claim 21, wherein the extracting step comprises:

Extracting surface areas or volumes at multiple pixel sizes as the plural fractal-based features *(see column 5, line 59-column 6, line 25, and these results in a set of volume approximation at different scales which allow us to obtain estimates of the surface area as a function of scale).*

Regarding Claim 24, *Huo discloses* the computer readable medium according to Claim 21, wherein the extracting step comprises:

extracting plural fractal-based features from an area of a region of interest of the mammogram based on a box-counting method *(see column 11, lines 3-16, the computerized method for the assessment of breast cancer risk based on the analysis of mammographic parenchymal patterns and box-counting method is well known).*

Regarding Claim 26, *Huo discloses* the computer readable medium according to Claim 21, wherein the applying step comprises: applying the features to a linear discriminant analysis classifier *(see column 9, lines 48-59, in performing the comparison*

of extracted features with the model, at least one of linear discriminate analysis, linear regression analysis and logistic regression analysis is performed on plural extracted feature).

Regarding Claim 27, *Huo discloses* the computer readable medium according to Claim 21, wherein the applying step comprises: applying the features to an artificial neural network classifier *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).*

Regarding Claim 27, *Huo discloses* the computer readable medium according to Claim 21, wherein the applying step comprises:

applying the features to an artificial neural network classifier *(see column 9, lines 48-59, extracted features are merged into a measure related to the risk of acquiring cancer by applying the extracted features as inputs to a trained artificial neural network outputting a risk classification index indicative of risk of acquiring cancer).*

Regarding Claim 30, *Huo discloses* the computer readable medium according to Claim 21, wherein the extracting step comprises:

extracting from the mammogram a multi-fractal characteristic associated with the texture of the parenchyma of the breast *(see column 9, line 60-column 10, line 8, extract features that characterize mammographic parenchymal patterns and relate to breast cancer risk would potentially benefit women seeking information regarding their individual breast cancer risk).*

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AKLILU k. WOLDEMARIAM whose telephone number is

(571)270-3247. The examiner can normally be reached on Monday-Thursday 6:30 a.m-5:00 p.m EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Samir Ahmed
Examiner
Art Unit 2624

/A. k. W./
Examiner, Art Unit 2624
12/16/2008

/Brian Q Le/
Primary Examiner, Art Unit 2624